Space Weather Forecast

Issued on Monday, 09 October 2023 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated M-class flares. Slight chance G1 Minor Storm day 1-3 (09-11 Oct) from arrival of fast solar winds. Chance G1-G2 Minor/Moderate storm intervals day 3-4 (11-12 Oct) due to CME arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with the strongest flare only common class and peaking at 08/0340 UTC. This was from the sunspot in the southeast. There are nine sunspot regions visible. The region in the northwest is the largest and most magnetically complex, with mixed polarity fields developing. A further smaller region in the in the southeast is the next most complex region, with ongoing growth also leading to the development of some mixed polarity spots. The remaining regions are all smaller and simpler. A coronal mass ejection (CME) was observed from the common class flare and has been assessed as being Earth-directed.

Solar Wind / Geomagnetic Activity: Solar winds have persisted at background speeds of 300-330 km/s. Total interplanetary magnetic field (IMF) strength, has been weak. The north-south component was mainly weakly negative (southward) until 08/1830 UTC, then varied weakly between positive (northward) and negative values. Geomagnetic activity has been Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at Background, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with isolated Moderate flares likely. There is a slight chance of very isolated Strong flare, either from the larger sunspot in the northwest or from the sunspot in the southeast.

Solar Wind / Geomagnetic Activity: There is one Earth-directed CME, with expected arrival either late day 3 or early day 4 (11-12 Oct). Otherwise current slow wind conditions are expected to give way to a transition into the fast winds from small coronal hole day 1 or day 2 (09-10 Oct) and then from the larger, more prominent coronal hole later day 2 or day 3 (10-11 Oct). This will likely bring peak winds of around 500-600 km/s. Quiet, isolated Unsettled geomagnetic activity is forecast at first. This will increase to Unsettled to Active later day 1 or more likely day 2 (09-10 Oct) ahead of the fast wind enhancements, before easing again. Later day 3 or early day 4 (11-12 Oct), activity will likely become Active with a chance of G1-G2 Minor/Moderate storms intervals due to any CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a slight chance of enhancements from the current sunspots on the disc, most likely the region in the northwest.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	30	30
Strong	G3	No	1	1	5	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	55	50
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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